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ABSTRACT

This study investigates how children learn not to overgeneralize about grammatical forms and how to reformulate hypotheses about the grammar of their language even when receiving little or no explicit feedback. Two proposals were looked at: (1) input monitoring theory stating that certain overgeneralizations are eliminated from production because children do not hear them in the input, and (2) a perspective that views much of the impetus for linguistic reorganization as coming from within the child rather than through input. The degree to which each of these perspectives explains children's reformulation of erroneous hypotheses was examined with 35 native English speakers aged 3.9 to 9.8. The children were given one production and two grammaticality judgment tasks. In one of the judgment tasks, the children were asked to judge a verb form in a single sentence, and in the other they were asked to both find nonsensical concepts and judge verb grammaticality. Results gave further evidence that children eliminate errors by monitoring the discrepancy between their production and their experience or input. However, when the experimental situation was modified so children were required to process information about both form and content, children did not acquire language to match an adult standard. (MSE)

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Learning Not to Overgeneralize*

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Introduction

Children often deviate from the norms of their native language and produce overgeneralised forms. Ingenious offerings such as "broked" and "tolded" are frequently reported (e.g. Ervin, 1964), and serve as evidence that children recognise and systematize regularities in linguistic input. Yet, the tendency to "avoid exceptions" and generate overgeneralisations primarily occurs late in the acquisition process, after the correct forms have been used appropriately. "U-shaped" trends in development reveal that children do not acquire language in an all or none fashion, but are often faced with the task of reformulating their working hypotheses about the linguistic system (Bowerman, 1982).

Investigations in this area have frequently focused on what children overgeneralise, in order to explore the ways in which they analyse the morphosyntactic or lexical systems of language (cf. Bowerman's discussions of children's analyses of causative verbs). The present study, however, investigates the relationship between the production of overgeneralisations and the ability to identify grammatical and ungrammatical forms in input in order to address what motivates children's revision of erroneous hypotheses.

It is generally accepted that the reorganization of linguistic rule systems is not motivated solely by the desire to communicate more effectively (Karmiloff-Smith, 1979; 1983; Bowerman, 1982). Even though the application of a productive rule such as "add an -ed inflection to the verb stem to form the past tense" to irregular English verbs results in ungrammatical output, it rarely hinders successful communication. Adults react to truth-value of children's utterances, not their structural well-formedness (Brown, 1973). Further, caretakers and playmates will usually comply to anomalous utterances without offering any opinion or useful information about their ungrammaticality (Bowerman, 1983).

The purpose of this study then was to investigate how children learn not to overgeneralise. What prompts children to reformulate productive, albeit erroneous, hypotheses about the grammar of their language in light of the fact that they receive little or no explicit feedback? Two proposals are examined.

First, Input Monitoring (e.g. Clark & Andersen, 1979; Clark, 1978) posits that certain overgeneralizations, like those of inflectional morphology, are eliminated from production because children do

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not hear them in the input. Consistent exposure to an irregular form where the child's own language production mechanism generates an overgeneralization, informs the child that their rule is inadequate. For this to be the case, 1) children must assume that there is one and only one "correct" form; and 2) they must be able to monitor input (i.e. to regulate what is heard and compare it to what is generated). Counter-examples in input provide information against which current hypotheses can be tested. Such analyses are prompted by the child's desire to "close the gap" between the productive and the receptive language systems.

Yet, the fact that children produce overgeneralizations after they have been using the correct irregular forms casts doubt on the possibility that children are sensitive to the match between input and output throughout the acquisition process. If so, one would not expect the emergence of overgeneralization errors in the first place given that they are rarely available as input, especially during conversations with adults.

Monitoring and the drive to match input may, however, operate when children refine, rather than initially formulate, productive rules. The tracking of input-output discrepancies can surely account for the elimination of overgeneralizations from production and may be the impetus for children's analyses of the more subtle aspects of the linguistic system. As Clark and Andersen (1979) state, "children monitor and check on those parts of the system they are in the process of acquiring" and a mismatch between input and output "motivates the continuing acquisition of the language systems even when they communicate effectively" (p. 11). From this view then, children learn not to overgeneralize because they produce overgeneralized forms and others around them do not.

Second, an alternative perspective views much of the impetus for linguistic reorganization as coming from within the child, rather than prompted by the structure of the available input (Bowerman, 1982; Karmiloff-Smith, 1979; 1983). Karmiloff-Smith, for example, envisions language as a "formal problem space" that children analyze and re-analyze for themselves in order to gain predictive control over a complex and often arbitrary linguistic system. Overarching organizational principles, which govern a variety of domains within cognitive functioning, are the motivators of hypothesis testing and rule revision.

She argues further that language learning would be hindered if children constantly monitored input. Overgeneralizations allow the child to simplify and unify the linguistic system. In doing so, they limit the assimilation of information contradictory to the child's current conceptualization of its structure. Counter-examples are ignored so that the child is free to work on other aspects of the linguistic or non-linguistic system. As Karmiloff-Smith states, if children monitored input throughout the acquisition of a particular system, the rules abstracted would "slip to and from between competing theories and the child would not have the opportunity to consolidate the procedure in the first place" (1979, p. 240).

Children must at some point, however, "gradually recognize" counter-examples. Clearly, the acquisition of language depends on regulating input and assimilating information about the adult system into internal structures. Yet, Karmiloff-Smith sees the monitoring process as the result of the child's linguistic reorganization, rather than the cause.

These two perspectives then differ in terms of when input plays a role in hypothesis reorganization. The first, Input Monitoring, predicts that children should be aware of input prior to the reformulation of an inadequate hypothesis. Here, it is the discrepancy between input and output that moves the child toward an adult-level of competence. In contrast, Karmiloff-Smith states that children should ignore counter-examples in input while they are overgeneralizing. Only after the reformulation process has begun is information in the input monitored and utilized.

Method

To investigate the degree to which each of these perspectives explains children's reformulation of erroneous hypotheses, 39 native English speakers (3;9 to 9;8) participated in a cross-sectional study of the English past tense inflectional system. The past tense was chosen because it is well-discussed in child language literature, as well as representative of a frequently utilized system that conveys information about changes in children's conceptualizations of linguistic structure throughout acquisition.

Three tasks were administered to the subjects individually. First, a Production task was used to elicit past tense forms of regular and irregular English verbs. This familiar paradigm involves the presentation of pictures of various activities while asking the child to complete a story about "what happened yesterday." For example, the child was shown a picture of a man drinking a cup of coffee while the experimenter read

> "This man is drinking coffee. He drinks coffee every day. What happened yesterday? Yesterday, he _____."

For the present purposes, the dependent measure was the percentage of the child's total responses that were applications of the regular -ed inflection to irregular verbs (e.g. drinked or iranked).

Two grammatical judgment tasks were also administered. Judgment Task I was a modification of a procedure used by Kuczaj (1978) in which children were asked to make judgments about a verb form in a single sentence. On each trial, the child was read a sentence that contained either an correct irregular past tense form (e.g. I usually don't take naps, but yesterday, I took a short one) or an incorrect overgeneralization (e.g. yesterday, I taked...), and was asked to listen and decide whether each sentence contained anything "silly or not correct." The concept of "silly" was defined as "not sounding right" and an example was given.

Judgments of grammaticality are assumed to be an index of children's ability to monitor orally presented input. If correct judgments are made, then the child can be said to have the capacity

to monitor input, a capacity he/she is potentially using in other contexts. For example, because the ability to make accurate judgments of past tense forms corresponded to the elimination of overgeneralization errors from production, Kuczaj (1978) concluded that monitoring may play a role in the reformulation of linguistic rule systems.

Other investigations using similar procedures have revealed that, like adults, children are much more likely to accept or reject an utterance because of its semantic content, rather than because of any structural anomaly it may contain (e.g. deVilliers & deVilliers, 1973). It is difficult, therefore, to assess whether the results from past investigations of children's judgments (Kuczaj, 1978) were dependent upon the grammaticality of the verb form itself, some other structural anomaly, or most likely, the potential bizarreness of decontextualized sentences typical of a study of this type.

Further, even if children do indeed make the required judgments on the basis of the grammaticality of the target form, it is not clear that such tasks require "monitoring" equivalent to that used in children's actual experiences with language. In these tasks, the target forms are presented in isolated sentences which do little to motivate the child to take the propositional content of the test items seriously. In natural language learning situations, however, children must attend to and process both meaning and form simultaneously if they are to be successful communicators. Although metalinguistic abilities, like the capacity to analyze structural aspects of language as distinct from its semantic content, are intriguing phenomena, most input that children receive is not likely to occur in contexts where its structure can be analyzed independent of its propositional content.

Therefore, a second test of judgment (Task II) was administered in which grammatical and ungrammatical past tense forms were embedded in a narrative about a young boy's adventures on a Saturday afternoon. Semantically anomalous phrases (i.e. real world impossibilities) such as "the dog let out a big meow" and "Joey stood on top of the door" were also included. The children followed a series of pictures while the experimenter read the story. They were asked to help find the "silly" words, as in Judgment Task I, and the "things that could not be true" (anomalous phrases).

The narrative allowed the correct and incorrect forms to be embedded in a significant context, rather than in isolated sentences. In sum, Task II served 1) to assess the relative salience of structural and semantic content, and 2) to ensure that the judgments of the past tense forms were made while attending to the information contained in the story -- as would be the case in actual language learning situations.

The dependent variables for each of the grammatical judgment tasks were the percentage of past tense forms the child appropriately identified as correct or incorrect. The results here were compared individually to those from the production task.

Results and Discussion

Table I presents the mean percentage of overgeneralizations produced by age group (4, 5, 6, 7, and 9 years). Children in each of the age groups productively applied the regular past tense rule ("add -ed") to irregular forms. This tendency negatively correlated with age ($r = -.67$, $p < .05$) and decreased to 3.5% by age 9. Analysis of variance procedures revealed a significant decrease in production errors between 6 and 7 years of age ($p < .05$).

These results suggest that the productive application of the regular -ed inflection to irregular verbs was common among children in the 4 to 6 year old age groups (mean = 22%). However, the proportion of ungrammatical output decreased as the children did not remain content with a rule that generated erroneous forms. Sometime during the period from 6 to 7 years then, the rule system for the English past tense was reformulated to restrict the application of the regular past tense inflection and to allow irregular forms.

Figure I presents the mean percentage of overgeneralized forms identified appropriately as incorrect in both Judgment Task I (sentences) and Task II (narrative). Results from the production task are also shown here (see Table I). As with production performance, the ability to make accurate grammatical judgments is well-established by age 7. For the two oldest age groups, performance on Task I and Task II improved in a parallel fashion indicating that their ability to make accurate judgments of grammaticality did not depend upon whether the target forms were presented in single sentences or in a narrative. Clearly, the 7 and 9 year olds are quickly approaching an adult level of competence in both the production and judgment of past tense forms.

Turning now to the focus of the study, note in Figure II that the three youngest age groups (4, 5, and 6 year olds) were significantly less proficient than the 7 and 9 year olds at identifying the ungrammatical overgeneralizations in both Judgment Task I and II ($p < .05$). In addition, for these children, the context in which the forms were presented appeared to influence performance, in that a different pattern of results was seen in the two Judgment tasks.

On Task I, in which the target forms were presented in single sentences, the accurate identification of ungrammatical forms paralleled the production of overgeneralizations. For example, the 5 year olds produced the greatest percentage of overgeneralizations and were also the most accurate at judging ungrammatical forms as "silly or not correct." These children appeared to pay attention to structural aspects of input just prior to the elimination of those errors from production. The results from Task I then, are consistent with the view that the monitoring of input prompts children to reformulate erroneous hypotheses.

In contrast, on Judgment Task II, where the target forms were embedded in a narrative, the results indicate that judgment abilities are inversely related to the productive overapplication of the regular past tense rule. Here, the three youngest age groups were virtually unable to identify the overgeneralized forms in the story. This ability improved slightly at age 6, but not significantly until age

AGE	% OVERGENS
4	24.0
5	27.7
6	16.9
7	7.3
9	3.5

TABLE I. Mean percentage of overgeneralizations produced by age gp.

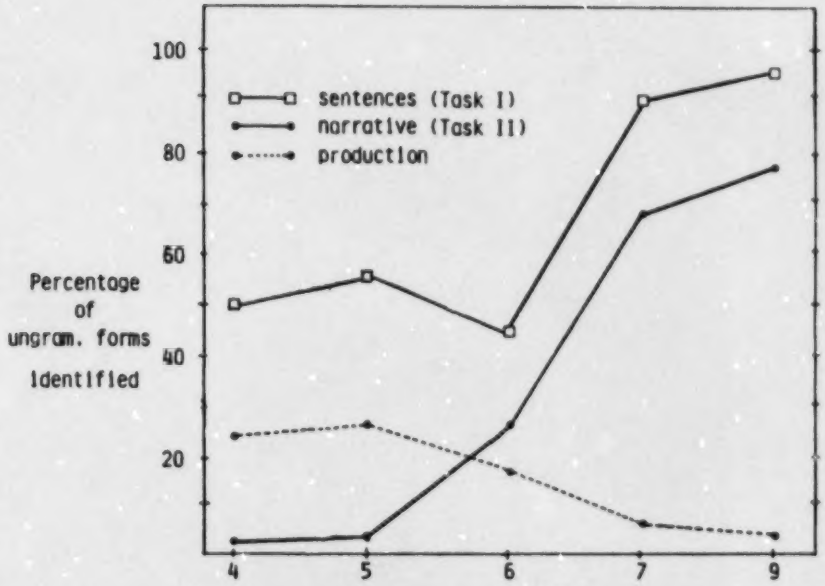

FIGURE 1. Mean percentage of ungrammatical past tense forms identified appropriately in sentences and in the narrative. Dotted line indicates production of overgeneralizations. (See Table I).

		TASK I		TASK II		
		Gram.	Ungram.	Gram.	Ungram.	Sem. Anomaly
AGE	4	64.3%	50.0%	100.0%	2.0%	40.0%
	5	75.0	56.5	98.5	2.9	52.0
	6	85.4	44.0	100.0	25.8	60.0
	7	97.2	89.7	98.5	67.1	66.0
	9	100.0	94.3	100.0	77.1	92.0

TABLE II. Mean percentage of grammatical and ungrammatical forms identified appropriately in two tests of grammatical judgment, mean percentage of anomalous phrases identified.

7. These data support the view that children ignore significant structural information while they are operating with productive hypotheses. From this perspective, rule revision is not prompted by the discrepancy between input and output, but rather by internal motives to be an organized user of language.

Lastly, Table I presents the percentage of correct irregular past tense forms (Task I and II) and semantic anomalies (Task II) identified. Consistent with the results from Kuczaj (1978), children were significantly more capable of accepting correct irregular past tense forms than rejecting ungrammatical ones, although this ability also positively correlated with age ($p < .01$). Further, the identification of the anomalous phrases embedded in the narrative posed little problem for even the youngest children. In fact, several children enthusiastically pointed out "impossibilities" that were overlooked by the experimenter. Performance on this portion of Task II improved in the older age groups, but was unrelated to judgments of grammaticality or a particular level of competence on the production measure. Clearly, children of all ages are capable of monitoring the propositional content of utterances -- it is only later that they are capable of monitoring both content and form.

Conclusion

This study investigated what motivates children to revise productive hypotheses about the English past tense inflectional system. Two experimental means of assessing the relationship between production of overgeneralizations and their identification in input were compared. When the overgeneralized forms were presented in single sentences, the results indicate that children are capable of monitoring input while they are overgeneralizing. Thus, further evidence is available for the hypothesis that children are prompted to eliminate errors by monitoring the discrepancy between their production and their experience.

However, when the experimental situation was modified so that children were required to process information about both form and content, Karmiloff-Smith's proposal is supported. Here, the overapplication of the regular past tense rule hinders children's ability to monitor structural information in input; and thus, children are not prompted to acquire language in order to match an adult standard.

From a methodological viewpoint, these results cast doubt on the validity of assessing monitoring using sentence-level test of grammatical judgment. In light of the problems with grammatical judgment paradigms in general (cf. Sinclair, et. al, 1978), the discrepancy in performance on the two tests used here emphasizes that semantic content indeed influences children's monitoring of input, and points to the importance of controlling for such variables.

Lastly, it is suggested that the results from the Judgment Task II (narrative) should be preferred on the basis of improved ecological validity. Although these results are not conclusive in themselves, taken together with the fact that a monitoring theory does not adequately explain why children produce overgeneralized forms in the first place, it is increasingly less plausible that children

learn language in order to match what is heard in the input. Rather, linguistic competence is a reflection of general principles of cognitive processing and children's drive to be efficient and organized builders of language.

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